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Fish Movement and Dietary History Derived from Otolith $\delta^{13}\text{C}$

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Habitat use and food web linkages are critical data for fish conservation and habitat restoration efforts, particularly for threatened salmonids species. Otolith microchemistry has been shown to be a powerful tool for reconstructing fish movement, but over small distances (kilometers), geology-derived differences in otolith chemistry are rare. Here, we demonstrate that otolith $^{13}\text{C}/^{12}\text{C}$ ratio (i.e. $\delta^{13}\text{C}$) of anadromous steelhead trout can be used to distinguish residence in small streams from residence in larger streams and rivers. While previous research has shown that water dissolved inorganic carbon $\delta^{13}\text{C}$ is the primary source of carbon in otoliths, the downstream change in food $\delta^{13}\text{C}$ in this watershed appears to be the primary control on otolith $\delta^{13}\text{C}$. As a result, this method can also be applied to the problem of reconstructing feeding history at a location.

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